

WHAT IS CLAIMED IS:

1. A semiconductor storage device comprising:
 a semiconductor layer (102, 211, 287, 411);
 a single gate electrode (104, 217, 417) formed on
5 the semiconductor layer, with a gate insulation film (103,
214, 414) disposed therebetween;
 a channel region (120, 121, 273) arranged under
the gate electrode;
 diffusion regions (107a, 107b, 212, 213, 412)
10 arranged on opposite sides of the channel region; and
 memory function bodies (105a, 105b, 131a, 131b,
261, 262, 461, 462) formed on opposite sides of the gate
electrode and having a function to retain electric charges.

- 15 2. A semiconductor storage device comprising:
 a semiconductor layer (102, 211, 287, 411);
 a single gate electrode (104, 217, 417) formed on
the semiconductor layer, with a gate insulation film (103,
214, 414) disposed therebetween;
20 a channel region (120, 121, 273) arranged under
the gate electrode;
 diffusion regions (107a, 107b, 212, 213, 412)
arranged on opposite sides of the channel region; and
 two charge storage regions (250),

each of the charge storage regions being in a shape of a film parallel to a surface of the semiconductor layer and existing over part of the channel region and part of the corresponding diffusion region, straddling a
5 boundary therebetween.

3. A semiconductor storage device comprising:

a plurality of memory elements (3, 4, 5, MTR) arranged along a word line (417, W),

10 wherein two memory function bodies (461, 462) having a function to retain electric charges are formed so as to extend along the word line on opposite sides of the word line,

each of the plurality of memory elements comprising:

15 a semiconductor layer (411);

part (417) of the word line ;

a gate insulation film (414) formed between the semiconductor layer and the part of the word line;

20 a channel region arranged under the part of the word line;

diffusion regions (412) arranged on opposite sides of the channel region; and

part of each of the memory function bodies (461, 462) that exists over part of the channel region and part

of the corresponding diffusion region, straddling a boundary therebetween.

4. The semiconductor storage device as claimed in
5 claim 3, wherein

the word line consists of a single word line,
the memory function bodies are arranged only on
both sides of the single word line, and

the memory function bodies are each comprised of
10 one or more insulative materials.

5. The semiconductor storage device as claimed in
claim 4, wherein a word line to be selected when
information is rewritten to the memory element is only the
15 single word line.

6. The semiconductor storage device as claimed in
claim 1, wherein

each of the memory function bodies is comprised
20 of one or more insulative materials, and

at least part of each memory function body is
formed so as to overlap with part of the corresponding
diffusion region.

7. The semiconductor storage device as claimed in any one of claims 1 through 6, wherein the semiconductor layer is comprised of a SOI layer.

5 8. The semiconductor storage device as claimed in any one of claims 1 through 6, wherein the semiconductor layer includes a well region (211).

10 9. The semiconductor storage device as claimed in any one of claims 1 and 3 through 5, wherein each of the memory function bodies includes a charge retention film (242, 250, 311, 312, 442) having a function of storing electric charges, and an insulator (241, 243, 245, 441, 443).

15 10. The semiconductor storage device as claimed in claim 9, wherein the charge retention film (242, 312, 442) includes a first portion that has a surface roughly parallel to a surface of the gate insulation film.

20 11. The semiconductor storage device as claimed in claim 10, wherein the charge retention film (242, 312, 442) includes a second portion extended roughly parallel to a side surface of the gate electrode or the word line.

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12. The semiconductor storage device as claimed in claim 11, wherein the insulator includes an insulation film (241, 441) that separates the gate electrode or the word line from the second portion of the charge retention film extended roughly parallel to the side surface of the gate electrode or the word line.

13. The semiconductor storage device as claimed in claim 10, wherein the insulator includes an insulation film (241, 441) that separates the first portion of the charge retention film from the channel region or the semiconductor layer.

14. The semiconductor storage device as claimed in claim 13, wherein the insulation film that separates the first portion of the charge retention film from the channel region or the semiconductor layer has a film thickness, which is smaller than a film thickness of the gate insulation film and not smaller than 0.8 nm.

15. The semiconductor storage device as claimed in claim 13, wherein the insulation film that separates the first portion of the charge retention film from the channel region or the semiconductor layer has a film thickness,

which is greater than a film thickness of the gate insulation film and not greater than 20 nm.

16. The semiconductor storage device as claimed in
5 claim 1 or 2, wherein each diffusion region (107a, 107b, 212, 213, 412) is effectively offset with respect to the gate electrode.

17. The semiconductor storage device as claimed in
10 claim 3, wherei each diffusion region (412) is effectively offset with respect to the word line.

18. The semiconductor storage device as claimed in
15 claim 16, wherein each memory function body includes an insulation film (499) formed on a remotest side from the gate electrode in order to secure a prescribed amount of offset of each diffusion region.

19. The semiconductor storage device as claimed in
20 claim 17, wherein each memory function body comprises an insulation film (499) formed on a remotest side from the word line in order to secure a prescribed amount of offset of each diffusion region.

20. Portable electronic equipment having the semiconductor storage device as claimed in any one of claims 1 through 3.